Environmental Energy Technologies Division

2013 Self-Assessment Project 1

A Self-Assessment of Lab Area Housekeeping Practices

March 20, 2013

Approved by:

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Introduction

Maintaining a clean and well-organized laboratory area is an important component of a safe lab environment. Trip hazards, improperly stored chemicals, and faulty equipment can cause accidents. Good housekeeping practices can also help to eliminate fire hazards and maintains access to important emergency equipment. The appearance of a lab area can also make a lasting impression on not only the personnel that regularly work in the area, but also on visitors and guests.

It has been noted in previous EETD lab area walkthroughs that housekeeping practices for some areas need improvement. There have been previous efforts to improve housekeeping of EETD lab areas. A self-assessment project involving the removal of numerous containers of unwanted chemicals and gas cylinders was very successful in cleaning up lab areas. Also, the recently completed hood sash self-assessment project included a focus on improved housekeeping inside fume hoods. A logical next step was to evaluate all EETD lab areas for overall housekeeping practices and make further improvements.

Requirements

Lab area housekeeping requirements are described in the following documents:

- LBNL PUB-5341, Chemical Hygiene and Safety Plan, Work Practice Controls- Housekeeping
- LBNL PUB-5341, Chemical Hygiene and Safety Plan, Hazardous Materials Storage Requirements
- LBNL PUB-3000, Health and Safety Manual, Chapter 4.6- Ventilation, Hoods, and HEPA Filters
- LBNL PUB-3000, Health and Safety Manual, Chapter 8- Electrical Safety
- LBNL PUB-3000, Chapter 12- Fire Prevention and Protection
- OSHA 29 CFR 1910.22, Housekeeping
- EETD Integrated Safety Management Plan- Section 9, "Identification and Assessment of Hazards"

All EETD personnel who handle hazardous materials in the wet lab areas must complete EHS0348 "Chemical Hygiene and Safety" training. This ensures employees are aware of chemical hazards and the use of engineering controls to protect themselves from these hazards.

Methodology

The following methodology was used to conduct this lab area housekeeping self-assessment project:

1. A total of 45 EETD lab areas were identified for this project.
2. Housekeeping practices were evaluated by the team using a standardized check sheet.
3. Each lab area was rated on a scale of 100-0 with a "100" being the highest possible score and a "0" being the lowest. This rating was based on the team's observations of container storage practices, container condition and labeling, glove box condition, hood condition,

equipment condition, and general area organization. Scores were categorized by the following ranges:
   a. 100-80 = Excellent
   b. 79-65 = Satisfactory
   c. 64- Lower = Needs Improvement
4. All EETD researchers and Lab Area Safety Leads were given prior notice of this self-assessment in order to prepare for the walk through.
5. The self-assessment walkthroughs were not scheduled with the lab occupants in order to get a real-time look at lab area conditions.
6. A survey was sent out to EETD lab owners and Lab Area Safety Leads to get their feedback on housekeeping issues. There were 5 responses submitted to the survey. The questions asked included:
   - Are there any particular practices you use that help ensure a well maintained work area?
   - Are there any obstacles that prevent you from keeping a well maintained work area?
   - What could LBNL or EETD do to make it easier for you to maintain your work area?
   - Check which issues you feel are the most significant housekeeping problems for labs in your department:
     - Glove box left cluttered
     - Bench tops left cluttered
     - Hoods left cluttered
     - Hazardous materials not properly stored
     - Hazardous materials and samples not properly identified
     - Broken glassware and unsecured sharps
     - Emergency shower/eyewash blocked
     - Personal protective equipment not properly stored or available
     - Tools and equipment in poor condition
     - Other: _____

The following personnel participated on the self-assessment team:
- Ron Scholtz- EETD Safety Manager
- Venkat Srinivasan- ESDR Department Head
- Michel Foure- ESDR Deputy for Research Operations
- Vincent Battaglia- ESDR Deputy for Research Programs
- Alex Lekov- EAEI Deputy for Research Operations
- Susan Synarski- EETD Space Coordinator

The scope of this project applied to the following:
1. Wet chemistry labs belonging to EETD in Buildings 62 and 70. This includes: 62-138, 62-150, 62-220, 62-246, 62-308, 62-310, 62-312, 62-314, 62-320, 62-342, 62-348, 62-350, 70-103, 70-108, 70-123, 70-134, 70-138, 70-157, 70-163, 70-173, 70-201, 70-215, 70-217, 70-

218, 70-220, 70-221/223, 70-226, 70-249, 70-257, 70-260, 70-263, 70-269, 70-274, 70-275, 70-289, 70-291/293, and 70-295/299.
2. All lab areas evaluated belonged to the ESDR or EAEI departments of EETD.

The following were excluded from the scope of this project:
1. Office Areas
2. Storage Closets
3. Common Areas

Summary of Findings, Observations and Noteworthy Practices

Lab area housekeeping scores are summarized in Attachment 2 of this report. Survey responses are summarized in Attachment 3.

Noteworthy Practices:

- Lab areas that have demonstrated excellent housekeeping practices include:
  - 62-138 (Doeff)- Score 80
  - 62-150 (Doeff)- Score 80
  - 62-342 (Cabana)- Score 90
  - 70-108 (Kostecki)- Score 90
  - 70-123 (Balsara)- Score 80
  - 70-157 (Russo)- Score 85
  - 70-174 (Kostecki)- Score 85
  - 70-260 (Maddalena)- Score 80
- Lab areas that need to continue efforts at improving housekeeping practices include:
  - 62-218 (Kerr)- Score 60
  - 62-246 (Kerr)- Score 60
  - 70-134 (Lunden)- Score 45
  - 70-163 (Mao)- Score 50
  - 70-173 (Cheng)- Score 60 (currently undergoing move-in)
  - 70-201 (Gundel)- Score 60
  - 70-217 (Gundel)- Score 50
  - 70-257 (Weber)- Score 50
- Many survey respondents indicated that frequent walkthroughs and self-inspections are helpful in maintaining an organized work area.
- Glove box, bench top, and fume hood clutter were common housekeeping issues cited in the survey feedback. In addition, hazardous materials labeling issues were also identified.

Suggestions:

- Lab area self-inspections should be increased in frequency to monthly, particularly for those areas that need further improvement. The inspection form should be simplified to something similar used for this self-assessment. In addition, an electronic self-inspection application is currently being developed for easier submittal and tracking.

- Personnel using the lab areas should be made more aware of housekeeping requirements. A simple "On the Job Training" (OJT) training packet has been developed as well as a "Safety Alert" to assist lab owners. In addition, these materials are now available on the EETD Safety website: *http://eetd-safety.lbl.gov*
- Lab areas showing excellent housekeeping practices should be recognized by division management for their efforts.
- Lab areas that need to show improvement need to have follow-up walkthroughs by division management to ensure efforts are being made to correct housekeeping issues identified.
- Some of the survey respondents indicated that it would be useful if they were provided with clearer guidance on how to dispose of various items. A simple information sheet available on the EETD safety website could be made available.
- Some of the survey respondents indicated that they don't have room to store all the equipment they need. Improved housekeeping practices could help to some extent. However, information on how to have rarely used equipment placed into off-site storage may be useful. This could be included in the information sheet mentioned above.
- Awareness efforts should continue to focus on self-assessment observations regarding clutter in glove boxes, fume hoods, and counter tops. Efforts should also continue regarding hazardous materials labeling. These should be considered in the upcoming "On the Job Training" effort.
- Designating a "cleanup day" has been suggested and was recently considered by EETD management. An organized division-wide effort should be implemented.

Findings:

- It was observed that a number of lab areas were storing hazardous materials without the required secondary containment trays. Further awareness communication and follow-up is needed to ensure this requirement is followed. (CATS- 9385-1)
- It was observed that several lab areas had chemical containers that were not clearly identified. It was also observed that some lab areas are using gas cylinders that are not clearly identified with a Chemical Management System (CMS) inventory bar code. (CATS-9385-2)
- It was observed that several lab areas have unidentified samples and used glassware stored in drawers, shelves, and cabinets. There is also an effort currently underway to address "orphaned chemicals" by Division Safety Coordinators and EHSS staff. (CATS-9385-3)
- Lack of visitor safety glasses or an obvious storage location for them was observed in a number of lab areas. Further awareness communication and follow-up is needed. Clearly labeled storage boxes should be placed in each lab. (CATS 9385-4)
- A number of lab areas have storage cabinet doors that do not operate properly. This can cause a serious accident if the door falls off its tracks. In addition, by not closing the cabinet doors when not in use, the contents will easily spill out during a seismic event. (Facilities notified and is investigating costs/logistics)

- A number of lab areas located on the second floor of Building 70 have unsightly water damage to the walls. This is due to water intrusion during the rainy season. Facilities is aware of the issue and has made recent repairs in 70-249. However, the outer walls of the building need to be sealed. (Facilities notified and is investigating costs/logistics)

Conclusions and Future Improvements

Conclusions

The following improvements to the EETD wet lab areas have been made as a result of this self-assessment project:

1. There has been an overall improvement in lab area housekeeping practices by lab personnel in anticipation of this self-assessment. Areas such as 70-163, 70-201, and 70-249 have shown significant improvement from previous observations. However, cleaning efforts in these areas need to continue.
2. Lab areas 62-138, 62-150, 62-342, 70-108, 70-123, 70-157, 70-174, 70-260 are recognized for high standards of housekeeping.
3. Lab areas 62-218, 62-246, 70-134, 70-163, 70-201, 70-217, 70-257 needs to take further efforts to improve housekeeping. Observations from the walkthrough should be addressed to make improvements.

Recommendations and Suggested Future Improvements

The following recommendations should be addressed in order to improve housekeeping practices in the EETD wet lab areas:

1. Regular interaction with Facilities Division personnel and the building managers is needed to ensure that lab area repairs are being made as needed. This includes items such as operation of cabinet doors and hood sashes.
2. Several labs in Buildings 62 and 70 are very old and are in need of an upgrade/modernization. This should be considered for any funding opportunities. These labs include: 62-218, 70-163, 70-226, and 70-249.
3. There is an LBNL-wide issue regarding "orphan" chemicals, samples, and potentially contaminated glassware left by past researchers. These items are not clearly identified and cannot be easily disposed. A team of Division Safety Coordinators is currently working with EHSS Division to come up with a feasible way to handle these items LBNL-wide.
4. Awareness and communications efforts regarding lab area housekeeping practices needs to continue. This can include reminder "Safety Alerts" and incorporation into "On the Job Training" efforts. Focus should be on glove box, bench top, and hood clutter, as well as hazardous materials storage/labeling.
5. The results of this self-assessment need to be made available to all PI's and Area Safety Leads for follow-up on issues identified specific to their areas.
6. A guideline should be developed by the Division Safety Manager and made available on how to dispose of various non-hazardous and hazardous items commonly found in a lab area to make it easier to clear-out needed lab space.

7. Glove box housekeeping and maintenance practices should be considered for a future self-assessment.

Attachment 1
Lab Area Housekeeping Check Sheet

EETD Lab Area Housekeeping Self-Assessment

Lab Area:

Principal Investigator:

Assessors:

Date:

Housekeeping Item	Yes	No	Pts.	Score
1. Food and drink is not present in the lab area			10	
2. Bench top areas are uncluttered and orderly			10	
3. Hood areas are uncluttered and orderly			10	
4. Aisles and exits are free of obstructions			10	
5. Hazardous materials are properly stored and contained			10	
6. Hazardous materials and samples are properly identified			10	
7. Area free of broken glassware and unsecured sharps			10	
8. Emergency shower/eyewash free of obstructions			10	
9. Personal protective equipment properly stored			10	
10. Tools and equipment in good condition			10	

Total Score: /100

Comments/Areas for Improvement

ATTACHMENT 2
Lab Area Housekeeping Scores and Observations

ESDR Lab Areas

Area	PI	Score	Observations
62-138	M. Doeff	**80**	- No visitor safety glasses available - Area appears very well organized. Improvement noted from previous observations.
62-150	M. Doeff	**80**	- Glove box housekeeping is very good. - Visitor safety glasses location needs to be more visible.
62-218	J. Kerr	**60**	- Hoods have a lot of clutter. - Hazardous materials not stored in secondary containment trays. - Storage in drawers needs to be improved. - Lab is old and needs new cabinets and counter tops. - Very crowded area. - Improvement from past observations noted, but efforts need to continue.
62-238	J. Kerr	75	- Cabinet doors do not close properly. Doors need to be repaired.
62-246	J. Kerr	**60**	- Glove boxes are cluttered and need further housekeeping. - Unlabeled containers observed in glove boxes. - Area has high levels of noise due to air handler unit. Request IH to conduct evaluation and make recommendations. - Storage in drawers and under cabinets needs to be improved. - Chemicals located in fume hood need to be stored in secondary containment trays. - Cabinet doors do not close properly. Doors need to be repaired.
62-305	G. Chen	75	- Chemicals not stored in secondary containment trays. - Visitor safety glasses not available.
62-308	J. Kerr	75	- Electrical panels on wall blocked by portable equipment. Need to place warning tape on floor in front of panels. - Chemicals located in fume hood need to be stored in secondary containment trays. - Baker in hood not labeled for contents.
62-310	J. Kerr	70	- Boxes and bottles being stored on the floor.

			- Electrical panel blocked by equipment. - Old chemicals require disposal. - Bench tops are cluttered.
62-312	G. Chen	70	- Glove box crowded and can use additional housekeeping. - Shelf being stored on floor behind glove box is a trip hazard.
62-314	G. Chen	70	- Chemicals need to be stored in secondary containment trays. - Seismic "lip" on shelves does not seem adequate to hold chemicals during an event. Consider adding higher lip or storing chemicals in a cabinet. - Oven should be seismically braced. - Electrical panel partially blocked. - Glass tubes stored on shelf stacked in a manner they could roll off. - Ceramic fiber pieces left on counter top. - Bench tops somewhat cluttered.
62-320	G. Chen	75	- Visitor safety glasses not available. - Equipment needs seismic restraints.
62-337	J. Cabana	70	- Garbage under bench - Empty cardboard boxes on benches - Overall area organization can be improved.
62-342	J. Cabana	**90**	- Area very well organized.
62-348	N. Balsara	70	- Glove boxes cluttered and need regular housekeeping. - Hoods very cluttered and need regular housekeeping.
62-350	G. Chen	75	- Old trauma kit needs to be removed. - Bench tops cluttered. - Hood is well organized.
70-108	R. Kostecki	**90**	- Area is very well organized. - Glove boxes and hoods are well organized. - Good labeling and signage practices. - Oven on rolling cart should be anchored.
70-123	N. Balsara	**80**	- Visitor safety glasses not available in box. - Area appears clean and organized. This includes hood and glove boxes. - Consider printing out labels on glove boxes rather than handwriting. May be hard to read.

70-129	R. Mehlhorn	75	- Visitor safety glasses not available in box. - Counter tops tidy but crowded. - Storage cabinets well labeled for types of chemicals stored.
70-157	R. Russo	**85**	- Area is very clean and well organized but crowded due to amount of equipment. - Laser screen near front door should be seismically secured. - Rolling cart next to rear exit door should be moved or secured.
70-163	S. Mao	**50**	- Area has shown significant improvement, but still needs a lot more work. - Hood is very cluttered and is being used for storage. - Laser screen near front door should be seismically secured. - Loose items such as old gas lines and equipment stored on the floor. - Power strips should be relocated off the floor surface due to flooding potential in the area. - Gas cylinders do not have the required CMS bar code affixed.
70-173	R. Cheng	**60**	- Area is very cluttered, but much is due to a researcher currently relocating into the area. - Boxes and equipment stored on the floor. - Counter tops cluttered.
70-174	R. Kostecki	**85**	- Area very clean and well organized.
70-206	V. Battaglia	65	- Storage of desiccators containing chemicals on shelves without seismic ledges. - General clutter on bench tops.
70-218	V. Battaglia	75	- Glove boxes very cluttered, particularly the glove box located along the wall. - No visitor safety glasses available in the storage box.
70-226	G. Liu	65	- Storage of equipment and boxes on the floor. - Area has shown overall improvement with old chemical clean-outs.
70-249	S. Mao	65	- Area has shown significant improvement, but still needs more work. - Large chamber located at side of room is no longer in use and taking valuable space. Needs to be removed (funding may be needed). - Hoods are very old and in need of repair. -Storage of glass jars and old equipment on the floor. - A number of unidentified sample containers need to be removed. These are

			on shelves in the rear room and in drawers.
70-257	A. Weber	**50**	- Hoods and counter tops are very cluttered. - Observed electrical power strip in front of walk-in hood that is a trip hazard. Also observed a puddle of water condensation next to the power strip. - A number of chemical containers were not identified for contents. - Storage of equipment and boxes on the floor restrict aisle space and access to the benches.
70-263	V. Srinivasan	70	- Recently remodeled lab. - Building water intrusion issue needs to be addressed by Facilities. - Cables crossing aisle between glove box and lab bench. Trip hazard. - Counter tops are cluttered.
70-269	S-G Chang	65	- Counter tops and hoods are generally cluttered. - Visitor safety glasses are not available in storage box. - Remove storage of empty solvent bottles under hood. - Storage of loose glassware and chemicals in drawers. - Container labeling practices are overall good, but some unlabeled containers observed in hood. - Difference noticeable in half of lab occupied by T. Chang group.
70-291	D. Lucas	65	- Lab area is currently being vacated and equipment is in the process of being moved out. - Cluttered floor presents trip hazards.
70-295	V. Battaglia	70	- Too many labels on hood sash. Hard to look in. - Unlabeled jar with jelly-like material in hood. - Unlabeled jar with black powder. - Unsecured razor blades on bench top. - Box storage on floor.
70-299	V. Battaglia	70	- Visitor safety glasses not available in storage box. - Hood has electrical power strip located in the front working area. Chemicals and liquids can come in contact. Should mount up and away from work surface. - Nitric acid container not secondarily contained. - Glove box has clutter needs to be improved.

EAEI Lab Areas

Area	PI	Score	Observations
70-103	H. Destaillats	70	- Bench tops cluttered - Box and equipment storage on the floor.
70-134	M. Lunden	**45**	- Bench tops cluttered - Hood very cluttered - Difficult to access areas due to storage on the floor. - Emergency shower/eyewash access obstructed by storage. - No visitor safety glasses available.
70-138	H. Destaillats	80	- Are has shown a good deal of improvement. - Best practice: Shelf storage, hanging electrical cords
70-201	L. Gundel	**60**	- Area has shown improvement from past observations, but efforts need to continue. - Sharps container over filled with broken glass projecting out. - Containers not clearly identified for contents. - Bench tops are cluttered.
70-215	T. Kirchstetter	75	- Area has overall good appearance and is organized. - Bench tops cluttered, but appears to be on-going work. - Keep cabinet doors closed to prevent glassware from falling out during a seismic event.
70-217	L. Gundel	**50**	- Hood very full and being used for storage. - Gas cylinder storage needs to be sorted out and empties returned. - Boxes being stored on the floor. - Area has an overall cluttered appearance.
70-221	R. Maddalena	75	- Nitrogen Dewar is restricting access over to Room 223. Should consider additional restraints to prevent rolling. - No legroom for personnel working at computer next to GC. - Tubing on wall should be better routed and secured. Needs to be identified for contents.
70-223	R. Maddalena	75	- Area has overall good organization and housekeeping practices. Very actively used area.

			- No legroom for personnel working at computer next to GC. - Sharps (needles) should be better secured to prevent accidental contact.
70-260	R. Maddalena	**80**	- Box storage on the floor.
70-264	R. Maddalena	75	- No visitor safety glasses available. - Area appears well organized.
70-275	L. Gundel	70	- Area has shown improvement from past observations, but efforts need to continue. - Water damage on walls requires Facilities follow-up. - Equipment on bench tops need seismic bracing.
70-278	M. Lunden	65	- Large boxes stored on floor blocking walking space in front of counters. - Sample bags stored on floor blocking access to equipment. - Safety shower access partially blocked by storage. - Area has shown some improvement from past observations.
70-289	H. Destaillats	65	- Hood area is cluttered. - Counter tops cluttered. - Equipment storage on floor presents a trip hazard. - Unsecured sharps located inside the hood.

ATTACHMENT 3
PI and Lab Area Safety Lead Survey Results

Response	Are there any particular practices you use that help ensure a well maintained work area?	Are there any obstacles that prevent you from keeping a well maintained work area?	What could LBNL or EETD do to make it easier for you to maintain your work area?	Which issues do you feel are the most significant housekeeping problems for labs in your department?
1	-None	-Unsure how to get rid of numerous types of items. I don't know how or it is often cumbersome to do so. - Not enough storage/space	-Have someone come out, evaluate items designated for disposal, and provide assistance in doing so. Perhaps provide documentation that the method described is formally sanctioned. - Help establish a procedure for disposal of standard items.	- Glove box left cluttered
2	-Frequent walkthroughs of area (at least once every hour)	- Some group members' pay a lot of attentions to housekeeping while others don't. It is essential to walk through the lab once every hour to keep it organized.	- Either incentives/awards for keeping labs clean or penalties for keeping them messy or a combination of both. The problem is a common responsibility of the entire group for maybe just one member who is messy.	- Glove box left cluttered - Bench tops left cluttered - Hoods left cluttered - Hazardous materials and samples not properly identified. - Broken glassware and unsecured sharps. -Emergency shower/eyewash blocked
3	-Designate and label a "home" for all items.	- No	- Identify good approaches to different issues and	- Bench tops left cluttered

	-Instruct users to clean area after work and return items to its "home".		promote it lab or division-wide. - Propose optional lab cleaning day periodically to clean-out clutter and make area more organized. - When area is cleaner and more organized, people have a motivation to keep it clean.	
4	- Regular maintenance and self-assessment - Safety minutes during group meetings - Committed personnel	- None	- I feel housekeeping is an internal group affair. In our case, there is nothing we cannot take care of ourselves.	- Glove box left cluttered - Hoods left cluttered - Hazardous materials and samples not properly identified - Broken glassware and unsecured sharps
5	- No, we don't have any official practices. Theoretically, individual's cleanup after themselves.	- Not enough storage area for equipment that is useful, but not used very often. This would help reduce clutter.	- Can't think of anything	- Bench tops left cluttered - Hoods left cluttered - Hazardous materials and samples not properly identified

ATTACHMENT 4
Example Housekeeping Awareness Training Slides

Laboratory Area Housekeeping Awareness

EETD
SAFETY TOPICS
FEBRUARY 28, 2013

1

Poor Housekeeping is a Safety Issue

- Maintaining a clean and well-organized laboratory area is an important component of a safe lab environment.
- Accidents are caused by trip hazards, improperly stored chemicals, and faulty equipment.
- The appearance of a lab area can make a lasting impression on visitors.
- Everyone who works in the lab area must do their part to maintain a clean and organized work area!

2

Clutter and Obstructions

- The lab must be kept clean, organized and free of clutter including:
  - Bench top areas
  - Fume hoods
  - Glove Boxes
- Aisles and exits must be free of obstructions.
- Do not block electrical panels and shut-off switches.

3

Emergency Equipment

- Good housekeeping helps eliminate fire hazards and maintains access to emergency equipment
- Never store items in front of emergency showers or eyewashes.
- Do not block access to fire extinguishers.
- Know where your spill cleanup supplies are located.
- Clean-up all spills immediately, including water drips.

4

Hazardous Materials and Waste

- All hazardous materials and sample containers must be clearly identified for contents.
- Liquid chemicals must be stored in secondary containment trays.
- Keep containers capped when not in use.
- Do not use fume hoods as a storage area for chemicals.
- Always place hazardous wastes in the designated Satellite Accumulation Area.
- Properly dispose of samples after experiments are completed.

5

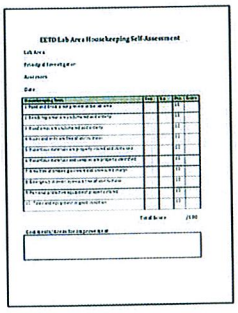
Equipment

- Do not allow electrical cords or tubing to trail across aisles or door ways.
- Always check electrical cords and plugs to make sure they are not damaged or frayed.
- Keep power strips off the floor to prevent contact with water spills.
- Do not "daisy chain" one power strip into another power strip.
- Large equipment on counter tops should be seismically secured with straps.

6

Everyone Must Do Their Part!

- Inspect your area regularly. A housekeeping check sheet is available.
- Notify your supervisor for issues that need their follow-up.
- Communicate with your co-workers about safety and housekeeping issues found in the area.



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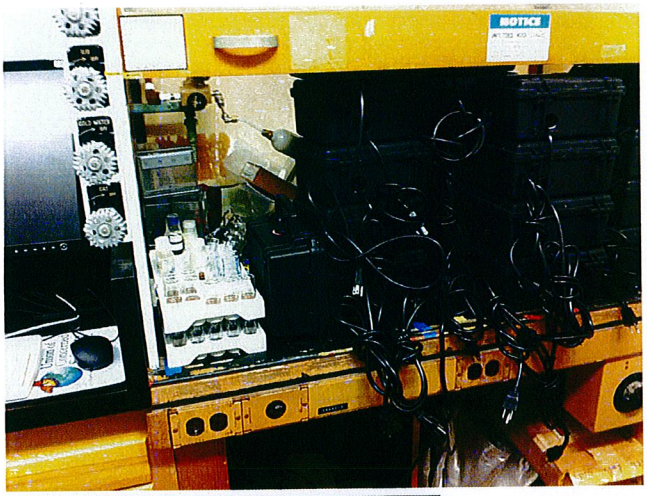
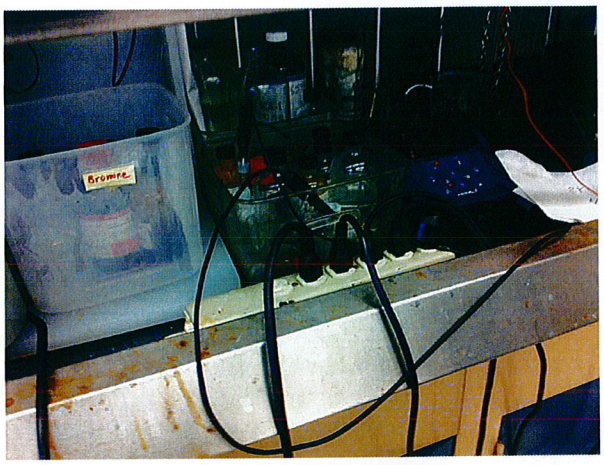
ATTACHMENT 5
Example Housekeeping Photographs

Example damaged cabinet doors that do not close



Example hood being used for storage

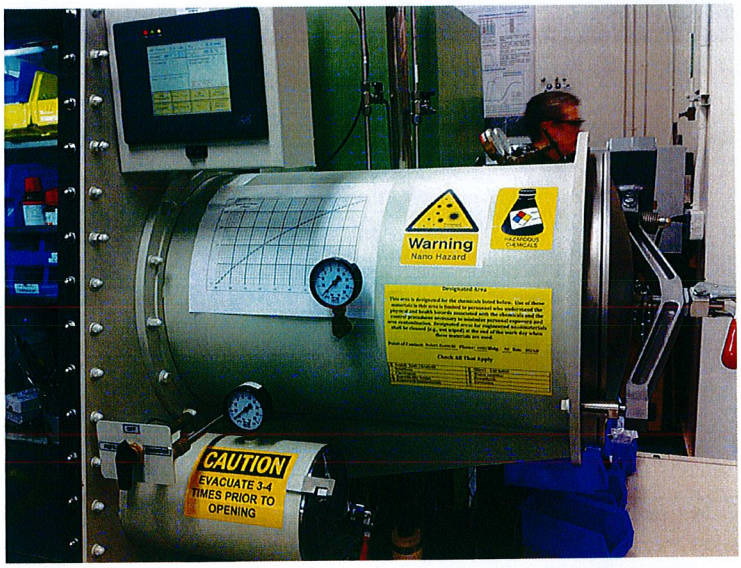
Multiple electrical outlets on floor next to water puddle



Electrical outlet placed inside hood.

Unidentified chemical samples stored in drawer

Unidentified chemical containers in hood



Best Practice- Glove Box Labels